

LAWRENCE A. EGAN

IBLA 85-785

Decided August 25, 1988

Appeal from a decision of the Wyoming State Office, Bureau of Land Management, rejecting simultaneous oil and gas lease application W-92548.

Affirmed.

1. Oil and Gas Leases: Applications: Drawings--Oil and Gas Leases: Known Geologic Structure--Oil and Gas Leases: Noncompetitive Leases

Lands within a known geologic structure of a producing oil or gas field may be leased only after competitive bidding under the provisions of 30 U.S.C. § 226(b) (1982). Where lands are determined to be within such a structure after a simultaneous oil and gas lease drawing but prior to issuance of a lease, a noncompetitive lease application for such lands must be rejected.

2. Oil and Gas Leases: Applications: Generally--Oil and Gas Leases: Known Geologic Structure--Oil and Gas Leases: Noncompetitive Leases

An applicant for a noncompetitive oil and gas lease who challenges a determination that certain lands are within the known geologic structure of a producing oil or gas field has the burden of showing by a preponderance of the evidence that the determination is in error.

APPEARANCES: Phillip D. Barber, Esq., Denver, Colorado, for appellant; Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE GRANT

Lawrence A. Egan has appealed from a decision of the Wyoming State Office, Bureau of Land Management (BLM), dated June 7, 1985, rejecting his noncompetitive oil and gas lease application drawn with first priority for parcel WY-413 on the December 1984 list of parcels available for simultaneous filings. The basis for the decision was that the lands embraced in parcel WY-413 were located within the known geologic structure (KGS) of a producing

oil or gas field. BLM explained its rejection of the simultaneous noncompetitive oil and gas lease application as follows:

The District Manager of our Rawlins office advised in a memorandum dated May 30, 1985, that the lands in this offer are entirely within the Frenchie Draw/Lost Cabin Known Geological Structure which was effective January 18, 1985.

Therefore, your application is rejected under regulation 43 CFR 3112.5-2(b) which provides that an offer shall be rejected if the lands are determined to be within a Known Geological Structure of a producing oil and gas field prior to the time a lease is issued. Lands on a Known Geological Structure are leasable only by competitive bidding in accordance with regulation 43 CFR 3120.

The Frenchie Draw-Lost Cabin KGS determination was based upon a geologic report dated January 18, 1985, prepared by Robert Janssen. The KGS study was undertaken in order to determine if the KGS's in the "Madden Deep" area were geologically related and to determine the presumptively productive limits of the Shannon Sandstone reservoir. The report indicates that the original Lost Cabin KGS, effective April 25, 1961, was defined based upon an Upper Cretaceous gas discovery in the No. 1 Spratt well in T. 38 N., R. 90 W., sec. 5, SE 1/4 SE 1/4 (Geologic Report dated Jan. 18, 1985, at 1). The geology of the producing horizons were described as follows:

The Frenchie Draw-Lost Cabin KGS produces hydrocarbons from the Wind River, Fort Union, Lance, Meeteetse, Mesaverde and Cody Formations. This KGS expansion is based on the projected extent of the first and second Shannon Sand reservoirs. The Shannon sands are found in the upper Cretaceous Cody Formation. The Cody is predominately gray to black marine shale in the lower part with interbedded sandstones and shales in the upper part.

The interbedded sands have been identified as the first, second, and third Shannon Sands in addition to the overlying "Sussex" Sands (Keefer, 1972). Correlations to the Shannon and Sussex sands of the Powder River Basin have not been made. The first and second Shannon sands appear at present to be the most widely productive sands and were therefore chosen to define the initial expansion of the Frenchie Draw-Lost Cabin KGS. These Shannon sands represent eastward regressive episodes during the time the Cody Shale was deposited (Keefer, 1972).

Isopach maps of the first and second Shannon Sands accompany this report. Sand thicknesses were taken from detail gamma logs when available. Porosity logs were used to eliminate sands of less than 6% porosity. In some cases the gamma log was available for the first Shannon Sand but not deep enough to have logged the second Shannon Sand. These show as points of no data

for the second Shannon. In two cases the only log available through the Shannon Sands was the Thermal Neutron Decay Time log and sand thicknesses were estimated from these. There are three maps accompanying this Geologic Report in the KGS case file, isopach maps of the 1st and 2nd Shannon Sands and the Frenchie Draw-Lost Cabin KGS map. The only wells plotted on these maps are those penetrating either one or both of the Shannon Sands. Well logs were not available through the Shannon Sand interval in all cases even though the well may produce gas from these sands. These wells are identified on the isopach maps.

Id. at 1-2. The expansion of the Frenchie Draw-Lost Cabin KGS was based on the 5-foot isopach of the first and second Shannon Sands.

In his statement of reasons on appeal, appellant challenges the KGS designation of the land sought in his lease application, described as lots 1 through 4, S 1/2 N 1/2, and S 1/2 of sec. 1; lots 3 through 9, SW 1/4 NE 1/4, S 1/2 NW 1/4, SW 1/4, W 1/2 SE 1/4 of sec. 2; and S 1/2 N 1/2 and S 1/2 of sec. 3, T. 39 N., R. 91 W., sixth principal meridian, Wyoming. Appellant argues that the closest well to the lands in his application, the 1-14 Mesa, located in the SE 1/4 NW 1/4, sec. 14, T. 39 N., R. 91 W., is an abandoned well with no producing intervals in the First Shannon Sand and an abandoned gas well in the Second Shannon Sand. Appellant argues that the closest producing well is the 1-14 Victor well located in the SE 1/4 SW 1/4, sec. 14, T. 39 N., R. 90 W., which he contends could not serve as a basis for extending the KGS to the lands in his application. Appellant contends that there are no other producing wells within 4 miles of the subject lands and that the abandoned 1-14 Mesa well does not justify the Frenchie Draw-Lost Cabin expansion 2 miles to the north. In a supplement to his statement of reasons filed with the Board on August 12, 1985, appellant has submitted an analysis of the Frenchie Draw-Lost Cabin KGS designation prepared by consulting geologist, D. Keith Murray (the Murray Report). The Murray report challenges the propriety of the Frenchie Draw-Lost Cabin KGS and states in part:

1. Lease WY-92548 falls outside of the closing structural contour (minus 14,000 to minus 14,500 ft., subsea) of Madden Deep gas field, as constructed on top of the "Shannon sandstone" interval (defined herein as that interval occurring between approximately 17,770 ft. and 18,100 ft. on the gamma ray-induction electrical log in Monsanto No. 2 Long Butte, NW 1/4 NE 1/2, Sec. 8, T.38N., R.91W.) in Madden field. This lease falls mostly below the minus 16,000-ft. structural contour and, based upon both published and proprietary geologic and geophysical (seismic) information, appears to be in an area of north dip (i.e., downstructure from Madden anticline) into the Cedar Ridge-South Owl Creek Mountains fault complex (refer to Ray and Keefer, 1985; Reid, 1978; Schmitt, 1975).

2. An iso-potential (initial production of wells) map to which the writer has access shows that the I.P.=1.0 MMcf/gpd (initial production equals 1 million cubic feet of gas per day, based

upon published data) iso-potential contour line falls at least two miles south of lease WY-92548. The nearest wells that had I.P.'s in excess of 1 MMcf/gpd are in Sec. 19, T.39N., R.90W. (I.P.=1.2MM) and in Sec. 17, T.39N., R.91W. (I.P.=1.225 MM), both located approximately two miles from WY-92548. The most prolific producers of gas from the "Shannon Sandstone" interval in the Madden Deep Unit are on the south flank of the structure, as contoured on top of this pay interval. I.P.'s of wells in this part of the field, which is from five to seven miles south of the subject lease, typically ranged from approximately 4 to 13 MMcf/gpd; cumulative production to date has been as high as 3 to 4 billion cu. ft. gas per well.

3. The Shannon test well nearest to WY-92548, the No. 1-14 Mesa Federal, in Sec. 14, T.39N., R.91W., was completed in November 1980 in the "Shannon sandstone" below 20,000 ft. for an I.P. of 60 Mcf/gpd-obviously, a non-commercial rate for a well this deep. It subsequently was abandoned in April 1982. The No. 1-14 well is located some 1,200 to 1,500 ft. higher structurally on top of the "Shannon sandstone" interval than is the lease in question. The "First Shannon Sand" and "Second Shannon Sand" isopach maps prepared in December by Robert Janssen of the Bureau of Land Management (accompanying his Geologic Report dated 18 January 1985) show the effective porosity in the No. 1-14 well to be nil in the "First Shannon" and 5 ft. in the "Second Shannon." From this information, it is obvious that porosity (above 6%, the cutoff value used by Janssen) and sand thickness as observed on the geo-physical well logs (usually, gamma ray-sonic logs) alone do not guarantee a commercial gas well in the deep "Shannon" reservoir.

4. Another gas well located relatively close to lease WY-92548 is the No. 1-14 Victor, in Sec. 14, T.39N., R.90W., which was completed in June 1981 for an I.P. of 687 Mcf and 113 bbls. water per day from the "Shannon sandstone" below 20,000 ft. This well, also non-commercial by any standard, has produced a total of only approximately 18.6 million cubic feet of gas and some 11,000 bbls. water; the well presently is shut in. A 20,000-ft. well today will cost at least 8 to 10 million dollars to drill and complete; it would need to produce at least three billion cubic feet of gas (assuming a present wellhead value of \$3.00 per Mcf) in order to merely break even, after deducting royalties, taxes, and operating expenses. According to Janssen's isopach maps, the No. 1-14 Victor exhibits 66 ft. and 17 ft. of effective porous sandstone in the "First" and "Second Shannon" sandstones, respectively. Yet, it is a non-commercial gas well.

5. A critical analysis of the data available to the writer leads to the obvious conclusion that no justification exists-- neither structural position nor a reasonable extrapolation of

nearby well productivities--for placing the lease in question within a "presumptively productive trap" (i.e., commercially productive) and, hence, within a known geologic structure (KGS), as defined in 43 C.F.R. § 3100.0-5(a). Even according to the two isopach maps prepared by Robert Janssen, lease WY-92548 is situated mainly in an area of thin effective porous sandstone in the "Shannon" (from nil to perhaps 20 ft. in the "First Shannon" and less than 5 ft. in the "Second Shannon").

6. As contrasted to the more gently dipping, relatively unfaulted north limb of Madden anticline (the flank on which lease WY-92548 is located), the more steeply dipping south limb is cut by numerous west-east-trending faults, as evidenced by both well and seismic data. The more prolific "Shannon" wells in Madden Deep Unit are associated with these faults; the permeabilities and effective gas storage properties of the "Shannon" reservoirs in these south flank wells have been significantly enhanced by fracturing associated with the faulting. On the other hand, "Shannon" wells on the north flank of Madden anticline are of low to very low (i.e., non-commercial) productivity, being in an area that exhibits little or no direct evidence of faulting and fracturing at depths involving the "Shannon sandstone" interval. [Emphasis in original.]

(The Murray Report at 3-4).

In a reply brief dated October 15, 1985, BLM has responded point by point to the Murray Report. BLM stated:

Statement of Facts

Point 1: The lands involved, as described by Murray, do fall outside of the closing structural contour of the Madden Anticline. We have interpreted there to be stratigraphic control of the gas in the Shannon and therefore the structural position will not control gas accumulation. The stratigraphic control interpretation is supported by the No. 1-29 Moneta Hills well, located in T. 38 N., R. 90 W., Section 29, which produces gas from the first Shannon and is located approximately at the synclinal axis of the Wind River Basin. The No. 1-31 Federal Reservoir Creek well located in T. 38, N., R. 90 W., Section 31, also produces gas from the first Shannon and is located to the south of the synclinal axis. The No. 21-16 Bucy State well, located [in] T. 37 N., R. 92 W., Section 16 is outside this KGS but it's [sic] structural position indicates that the gas in the first Shannon is controlled stratigraphically. Thus, there is stratigraphically controlled gas in the Shannon both in and near the Frenchie Draw/Lost Cabin KGS. Reid, 1978, states on page 36 that stratigraphic trapping of hydrocarbons is an important factor at Madden Deep Unit and is the primary trapping mechanism found to date.

Point 2: We have not seen the iso-potential map referred to here, but; the 1,000 MCFGPD iso-potential contour line referred to by Mr. Murray, which is located two miles south of the lands involved should not be considered the limit of the KGS (i.e., presumptively productive limit).

Point 3: Mr. Murray states that porosity and sand thickness as observed on the geophysical well logs (as used in the KGS report) alone do not guarantee a commercial gas well in the deep Shannon reservoir. In reply, we must state that a KGS designation does not guarantee a commercial gas well, but instead attempts to define the presumptively productive limits of a reservoir.

Point 4: Mr. Murray presents, in this point, some economic data for the No. 1-14 Victor well located in T. 39 N., R. 90 W., Section 14 and concludes that it is a non-commercial gas well. This well was completed as a gas well in the Shannon. The Frenchie Draw/Lost Cabin KGS is based on the interpreted limit of the presumptively productive land and not the limit of where a commercial versus non-commercial well could be drilled.

Point 5: Mr. Murray, in this point, equates a [presumptively] productive trap with being commercially productive. Neither BLM manual 3022 (Known Geologic Areas) dated June 28, 1985, [nor] 43 CFR 3100.0-5 which defines KGS mention anything about commerciality but both define the KGS based on all acreage which is presumptively productive. The commerciality of a well or a petroleum reservoir can change rapidly based on drilling costs, petroleum market, product price, and technology developments. Commerciality is therefore a concept which changes too readily for use in KGS determinations.

Point 6: Mr. Murray states that the Shannon wells on the north flank of the Madden Anticline are of low to very low productivity, being in an area that exhibits little or no direct evidence of faulting and fracturing in the Shannon. These wells may have lower initial productions than the wells on the south flank of the Madden Anticline, however; the Shannon Sand reservoir does exist on the north flank and the wells present do prove the presumptively productive nature of the reservoir.

(Reply Brief at 2-3).

In response to the BLM reply brief, appellant has submitted a second supplemental statement of reasons dated March 17, 1986, which contains a reply authored by D. Keith Murray. Murray questions why two wells productive from the First Shannon sand in the Moneta Hills gas field in secs. 29 and 31, T. 38 N., R. 90 W., south of the synclinal axis of the Wind River Basin, 10 miles from lease W-92548, were not included in the Lost Cabin KGS.

Murray further states that the Moneta Hills wells are located low on the south flank of the Wind River Basin, while the Madden field and lease W-92548 are on the north flank of the basin, which has been overridden by the southward-thrusted Owl Creek Mountains uplift. Murray states that "these two areas are in two separate geologic and structural regimes. As a result they undoubtedly are characterized by separate trapping environments and separate combination structural-stratigraphic traps" (Second Supplemental Statement of Reasons at 2). Murray also contends that since BLM stated in its October 9, 1985, report that gas accumulation in the Shannon interval was not entirely controlled by structure, a structure map should have been submitted covering the KGS and surrounding area in order to determine the relationship of net effective porosity in the first and second Shannon sandstones relative to geologic structure and well performance. Murray continues that BLM's isopach maps do not define a stratigraphic trap, that is, no zero line, sandstone pinch out, or reservoir limit is indicated, nor, he states, can the direction of formation dip be discerned. He contends that available evidence indicates the trapping mechanism operative in the Shannon reservoirs in the Madden area include both structural and stratigraphic elements and that BLM has failed to demonstrate that both elements had been considered in the designation of the Frenchie Draw-Lost Cabin KGS.

BLM has submitted a reply to appellant's second supplemental statement of reasons dated May 6, 1986. BLM responds to appellant's complaint that two Moneta Hills gas field wells located in secs. 29 and 31, T. 38 N., R. 90 W., were not included in the Frenchie Draw-Lost Cabin KGS expansion by stating that the wells were previously included in the Lost Cabin KGS. Responding to Murray's contention that the Moneta Hills wells are located in separate and distinct geologic and structural regimes from the Madden Field and lease parcel W-92548, BLM responds:

The Madden field is centered near the crest of the Madden Anticline, however Shannon gas wells are located both to the north and south of this crest. The Moneta Hills wells are the furthest to the south being located at or near the trough separating the Madden Anticline from the large south limb of the Wind River Basin. Other wells are located on the north limb of the Madden Anticline but not as far north as the reverse or thrust faulted Owl Creek uplift which forms the northern boundary of the KGS. The north and south flanks of the Madden Anticline are not necessarily separate traps or separate reservoirs.

(Response to Appellant's Second Supplemental Statement of Reasons at 1). BLM responds that no zero-line or sandstone pinch out is plotted on the isopach maps because, "[i]f it exists, it is outside the limits of the KGS." BLM states that it is its belief that no definitive statement can be made, based on seismic sections, as to the gas or water-bearing nature of a thin sand at a projected depth of over 20,000 feet (Response to Second Supplemental Statement of Reasons at 2).

[1] Section 17 of the Mineral Leasing Act of 1920, as amended, 30 U.S.C. § 226(b) (1982), provides that "[i]f the lands to be leased are

within any known geological structure of a producing oil or gas field, they shall be leased to the highest responsible qualified bidder by competitive bidding * * *." See 43 CFR 3100.3-1; 43 CFR Subpart 3120 (concerning competitive leases). The regulation specifically governing simultaneous noncompetitive oil and gas lease applications for lands within a KGS provides:

If prior to the time a lease is issued, all or part of the lands in the offer are determined to be within a known geological structure of a producing oil or gas field, the offer shall be rejected in whole or in part as may be appropriate and the lease, if issued, shall include only those lands not within the known geological structure of a producing oil or gas field.

43 CFR 3112.5-2(b). It is well settled that a noncompetitive lease application for lands designated within a KGS must be rejected where lands embraced in that application are designated as within a KGS prior to issuance of the lease. See, e.g., Leonard Luning, 87 IBLA 123 (1985); John P. Brogan, 85 IBLA 379 (1985); Evelyn D. Ruckstuhl, 85 IBLA 69 (1985). This Department has no authority to issue a noncompetitive lease for lands within a KGS. McDonald v. Clark, 771 F.2d 460 (10th Cir. 1985); McDade v. Morton, 353 F. Supp. 1006 (D.D.C. 1973), aff'd, 494 F.2d 1156 (D.C. Cir. 1974).

[2] This Board has stated repeatedly that an applicant for an oil and gas lease who challenges a determination that certain lands are situated within the KGS of a producing oil and gas field has the burden of showing the determination is in error. Evelyn D. Ruckstuhl, supra; Reed International, 80 IBLA 145 (1984); R. C. Altrogge, 78 IBLA 24 (1983). The burden on appellant is to show by a preponderance of the evidence that the determination is erroneous. See Bender v. Clark, 744 F.2d 1424 (10th Cir. 1984).

The term "known geological structure" is defined as "technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive." 43 CFR 3100.0-5(l). The Secretary of the Interior has historically delegated the responsibility for determining the existence and extent of a KGS to his technical expert in the field. When that expert makes a determination that lands qualify for a KGS, the Secretary is entitled to rely upon that reasoned opinion. Bruce Anderson, 63 IBLA 111 (1982). The Board has held that KGS determination recognizes the existence of a continuous entrapping structure on some part of which there is production, or of numerous related, but nevertheless independent stratigraphic as well as structural traps. A KGS designation of certain land may be made on the basis of drill stem tests, not just completed producing wells, which indicate that a reservoir which extends under such land is productive. Thunderbird Oil Corp., 91 IBLA 195 (1986), aff'd sub nom. Planet Corp. v. Hodel, Civ. No. 86-679 HB (D.N.M. May 6, 1987). However, it is not a guarantee that all lands included therein are commercially productive. See, e.g., Evelyn D. Ruckstuhl, supra; Robert G. Lynn, 61 IBLA 153 (1982).

This Board has previously acknowledged that where the trap is stratigraphic rather than structural, determination of the extent of a KGS is more

problematic. Thunderbird Oil Corp., *supra*. Inasmuch as a stratigraphic trap is normally occasioned by facies changes altering porosity and permeability in the reservoir rock, the proper limit of a KGS is open to differences in interpretation. Upon review of the record, including the submissions by counsel on appeal, we are unable to conclude that appellant has shown by a preponderance of the evidence that the lands embraced in the lease offer are not within the trap which has been determined to be productive and, hence, that the lands are not presumptively productive.

At best, appellant has established that geological experts may disagree regarding the exact location of a KGS boundary. Where such differences of opinion exist and the appellant has not shown that his interpretation of the data is more likely to be correct than that of BLM, the Board will sustain the BLM finding. B. K. Killion, 90 IBLA 378 (1986); Sherbourne Partnership, 90 IBLA 130 (1985).

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed.

C. Randall Grant, Jr.
Administrative Judge

I concur:

John H. Kelly
Administrative Judge

